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MODULAR REFRIGERATION AND FOOD STORAGE SYSTEM

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(71) Applicant(s)
LIONEL CLYVE THOMAS

(72) Inventor(s)
LIONEL CLYVE THOMAS

(74) Attorney or Agent
JOHN L DAVIES & CO , PO Box 436, MOUNT WAVERLEY VIC 3149

(57) A modular system of stackable and interlatchable thermally insulated panels (16,17,18,19;116,117,118,119) can be assembled into a vertical storage cabinet (110) for hot or cold perishable foods or a horizontal wheelable trolley (10), both cabinet and wheelable trolley are latchably attachable to and detachable from a wheeled refrigeration unit (28,111) respectively; panels of the trolley are latchable together by means of co-operating pairs of latch members exemplified by (20,20; 21,21a; 22,22a; 23,23a; 24,24a; 26,26a; while the trolley is latched onto the wheeled refrigeration unit by latches (25,25a; 27,27a;); the cabinet panels are locked together by latches 132,132a;133, 133a;134,134a; 135,135a; the bottom panel of the cabinet (111a) forms the top of the cabinet refrigeration trolley unit (111) and is latched to it by latches (136,136a; 137, 137a) shown on one side; the top panel of the trolley (111) is latched to it by latches on each side such as latches (138,138a;139,139a). the top panel of the cabinet refrigeration unit has an air circulation grill (111b) in it circulating air within the cabinet (110)

This invention relates generally to food storage and transport equipment and relates in particular to a modular system of stackable and interlatchable panels which can be assembled into either a food trolley serving unit or a wheelable food storage cabinet unit, both units being latchable onto and separable from a wheelable refrigeration unit.

According to the invention there is provided a modular system of stackable and interlatchable thermally-insulated panels which can be assembled into a vertical storage cabinet unit for hot or cold perishable foods or a horizontal wheelable trolley serving unit, both said units being detachably joinable to a respective wheelable refrigeration unit.

According to one form of the invention, the modular system comprises a food storage and serving cabinet or hot and cold foods trolley which is constructed as a modular system of stackable, interlatchable and detachable insulated panels which from an initially stacked storage or transport condition can be assembled on site into the said cabinet and in horizontal position and which is adapted in an initial cooling mode to be refrigerated by being coupled to a separate detachable and wheelable refrigeration unit.

More particularly, the above described form of the modular system of the invention adapted for use as horizontal food-serving trolley comprises a thermally insulated base panel, four further thermally-insulated panels comprising two side panels, a top panel and an end panel, one end of the cabinet being left open for detachably fastening thereon the separate, wheeled refrigeration unit which has one side open for coupling to the open side of the cabinet to allow circulation of cooling air.

More particularly, the base panel is mounted upon a rectangular steel base frame having mounted thereon at each corner a freely-rotatable ground or floor-contacting member.

Preferably, all the panels of the cabinet are detachably latched together when assembled into a rectangular box-like structure by a series of pairs of co-operating, by a series of pairs of co-operating, two-component catch members fixed onto adjoining panel material in lockable
5 alignment .

Preferably, the freezer or refrigeration unit is latchable onto and is separable from the cabinet by means of the said co-operating pairs of catch members.

According to an alternative form of the invention, the cabinet is a
10 vertical storage unit with a hinged, thermally-insulated door and is constructed as a modular system of stackable, interlatchable and detachable insulated panels which, from an initially-stacked condition, can be assembled on site into a vertical food storage cabinet for hot and cold foods and is adapted in an
15 initial cooling mode to be refrigerated by being coupled or stacked onto a separate and detachable, two-part, wheelable refrigeration or freezer unit, the refrigerator or freezer unit has a top part latchable onto and detachable from the storage cabinet by a system of latches.

More particularly, the system with the vertical storage cabinet comprises a thermally-insulated top panel attachable to and detachable from
20 thermally-insulated side panels and a thermally insulated back panel.

More particularly, the bottom of the vertical storage cabinet is when pre-assembled left open for latching thereon the top of the above-described separable refrigeration unit and preferably the said top is also provided with a circulation air-flow and air return grill.
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Preferably, in both horizontal and vertical embodiments of the cabinet of the food storage system of the invention, the evaporator unit is fan forced and will perform a defrost on/off cycle without loss of temperature.

Some non-limiting embodiments and arrangements of components into the food storage system of the invention will now be described with reference to the accompanying drawings in which :

5 Figure 1 is an exploded view of a horizontal embodiment of the invention.

Figure 2 is an exploded view of a vertical embodiment of the food storage system of the invention.

Figure 2A is a perspective view of a refrigeration unit latchable onto and separable from the cabinet of Figure 1.

10 Figure 2B is a perspective view of a top fittable onto the refrigeration unit of Figure 2A.

Figure 3 is a perspective view of a catch in unfastened position for use in joining the panels of the food storage cabinet of the invention.

15 Figure 3A is a perspective view of the catch of Figure 3 in fastened position when locking the panels together.

Referring to the drawings and first of all to Figure 1, there is shown in an exploded or pre-assembled state a food storage cabinet which is constructed as a stackable modular system of interlatchable and detachable or separable thermally-insulated panels such as a sandwich structure of steel panels with a core of foamed polystyrene or polyurethane and which from an initially stacked condition can be assembled on site into a horizontal food storage and servery cabinet or trolley for hot and cold foods and which is adapted in an initial cooling mode to be refrigerated by being coupled to a separate and detachable refrigeration unit, or to a heating unit in an initial warming mode. The first embodiment of the system comprises a thermally-insulated base panel 11 mounted upon a rectangular steel base frame 11a which has mounted thereon at each corner

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a freely-rotatable ground or floor-contacting member such as the castors 12, 13, 14, and 15, respectively. Upon this base panel 11, there is adapted to be mounted two thermally-insulated side panels 16, 17, a top panel 18 and a thermally-insulated end panel 19. The other end of the cabinet is left open for latching thereon a separable refrigeration unit as will be explained later on. All the panels of the cabinet 10 are detachably held together when assembled into a rectangular box-like structure by a series of pairs of interlocking latches of the type shown in Figure 3 and labelled 20a, 20b; 21a, 21b; 22a, 22b; 23a, 23b; 24a, 24b; 25a, 25b; 26a, 26b; 27a, 27b; wherein the larger hand lever and locking-loop components are specifically designated as "a" components and the smaller associated notched-plate components are specifically designated as "b" components as labelled in Figure 3 which is a detail of the fastener in unlatched position and Figure 3A which is a detail of the fastener in latched position. A suitable latch is that sold by Birrus Engineering Pty.Ltd. of Clayton, Victoria, and the subject Redditch United Kingdom patents Nos. 0047059 and 4428608. A detachable and wheelable refrigeration or freezer unit 28 is attachable to and separable from the cabinet 10 as a unit by means of latches of the type shown in Figures 3 and 3A. There is housed within the refrigeration unit 28 a compressor 29, evaporator coils 30 and condensor coils 31 together with the usual or standard thermostatically controlled switch and if desired the unit can be three way -that is to say direct current, alternating mains current or LP gas.

In the vertical embodiment of Figures 2, 2A and 2 B, there is also shown in exploded or pre-assembled state a cabinet 110 which is constructed as a stackable, interlatchable and detachable insulated panels which from an initially stacked storage and transport position can be assembled on site into a

vertical food storage cabinet for hot or cold foods and which is adapted, in an initial cooling or warming mode to be refrigerated by being stacked onto a separate, latchable and detachable wheelable refrigeration or freezer unit 111 constructed with a box-like open-topped body which has a detachable insulated top panel 111a latchable to and detachable from the storage cabinet (which has an open bottom) by a system of latches for example of the type shown in Figures 3 and 3A. This refrigeration unit 111 also has mounted thereon four castors (or they could be wheels, rollers or the like) 112, 113, 114, 115. All of the panels of the cabinet 110 are mutually latchable to form a cabinet of rectangular box-like configuration by means of latches of the type shown in Figure 3 and 3A and the same as in the horizontal embodiment of Figure 1. The vertical cabinet embodiment comprises a thermally-insulated top panel 116, thermally-insulated side panels 117, 118 and a thermally-insulated back panel 119. Standard refrigerator door hinge plates 120, 121 are provided at the top and bottom of a front edge of one side panel. A plurality of vertically-spaced, removable wire grid storage shelves 122, 123, 124 are provided. The bottom of the cabinet is left open for latching thereonto the top panel 111a of the separable refrigeration unit 111 referred to above. The top 111a of the refrigerator unit 111 also has a circulation-air flow and return grill 111b. The refrigeration unit has a compressor 125, an evaporator 126 and condensor coils 127, 128.

The unit is provided with power points or switches 129, 130 and a three pin socket 131 for connection of power cords and the like. For food warming a fan heater unit may be installed.

In both horizontal and vertical embodiments of the trolley or cabinet used in the food storage system of the invention, the evaporator of the

refrigerator unit is fan-forced and will perform a defrost on/off cycle without loss of temperature.

5 The top panel of the cabinet is provided with multiple slots such as one shown labelled 18a for placement therein of lidded plastic food containers such as the box labelled 18b.

10 In the respective, abovedescribed embodiments the cabinet panels are locked together by eight sets of latches only the four 132,132a; 133,133a; 134,134a;135,135a being shown and the bottom panel of the cabinet which also forms the top panel of the cabinet trolley unit is latched to it by two pairs of latches 136,136a;137,137 two pairs only being shown in Figures 1 and 2B. The top panel 111a of the cabinet refrigeration unit is latched to it by two pairs of latches 138,138a; 139,139a and 140,140a; 141;141a

The claims defining the invention are as follows:

1. A modular system of stackable and interlatchable thermally-insulated panels which can be assembled into a vertical storage cabinet unit for hot or cold perishable foods or a horizontal wheelable trolley serving unit, both said units being detachably joinable to a respective wheelable refrigeration unit.
2. The modular system according to claim 1 which comprises a food storage and serving cabinet or hot and cold foods trolley which is constructed as a modular system of stackable, interlatchable and detachable insulated panels which from an initially stacked storage or transport condition can be assembled on site into the said cabinet and in horizontal position and which is adapted in an initial cooling mode to be refrigerated by being coupled to a separate detachable and wheelable refrigeration unit.
3. The modular system according to claim 1 or 2 which comprises a thermally insulated base panel and four further thermally-insulated panels comprising two side panels, a top panel and an end panel, one end of the cabinet being open for detachably fastening thereon the separable refrigeration unit.
4. The modular system according to claim 3 wherein the base panel is mounted upon a rectangular steel base frame mounted upon freely-rotatable ground or floor-contacting members.
5. The modular system according to any preceding claim wherein all the panels of the cabinet are detachably held together when assembled into a rectangular box-like structure by a series of pairs of co-operating, two-component catch members fixed onto adjoining panel material in lockable alignment.

6. The modular system according to any preceding claim wherein the freezer or refrigeration unit is latchable onto and is separable from the cabinet by means of the said co-operating pairs of latching members.
7. The modular system according to any preceding claim wherein the cabinet is a vertical storage unit with a hinged, thermally-insulated door and is constructed as a modular system of stackable, interlatchable and detachable insulated panels which, from an initially-stacked storage and transport condition, can be assembled on site into a vertical food storage cabinet for hot and cold foods and is adapted in an initial cooling mode to be refrigerated by being coupled or stacked onto a separate and detachable wheelable refrigeration or freezer unit.
8. The modular system according to claim 7 wherein the refrigerator or freezer unit has a top part latchable onto and detachable from the open bottom of the storage cabinet by a system of latches.
9. The modular system according claim 7 or 8 wherein the vertical storage cabinet comprises a thermally-insulated top panel attachable to and detachable from thermally-insulated side panels and a thermally insulated back panel.
10. The modular system according to claim 9 wherein the wheelable and separable refrigeration unit has a top which is provided with a circulation air-flow and air return grill.
11. The modular system according to any preceding claim wherein in both horizontal and vertical embodiments of the cabinet of the food storage system of the invention, the evaporator unit is fan forced and will perform a defrost on/off cycle without loss of temperature.
12. A modular system of stackable and interlatchable thermally insulated panels which can be assembled into a horizontal wheelable food

serving trolley substantially as hereinbefore described with reference to Figure 1 of the accompanying drawings.

13. A modular system of stackable and interlatchable thermally insulated panels which can be assembled into a vertical food storage cabinet substantially as hereinbefore described with reference to Figure 2 of the accompanying drawings.

Dated this 18th day of October, 1996

LIONEL CLYVE THOMAS

By My Patent Attorney

JOHN L.DAVIES & CO.

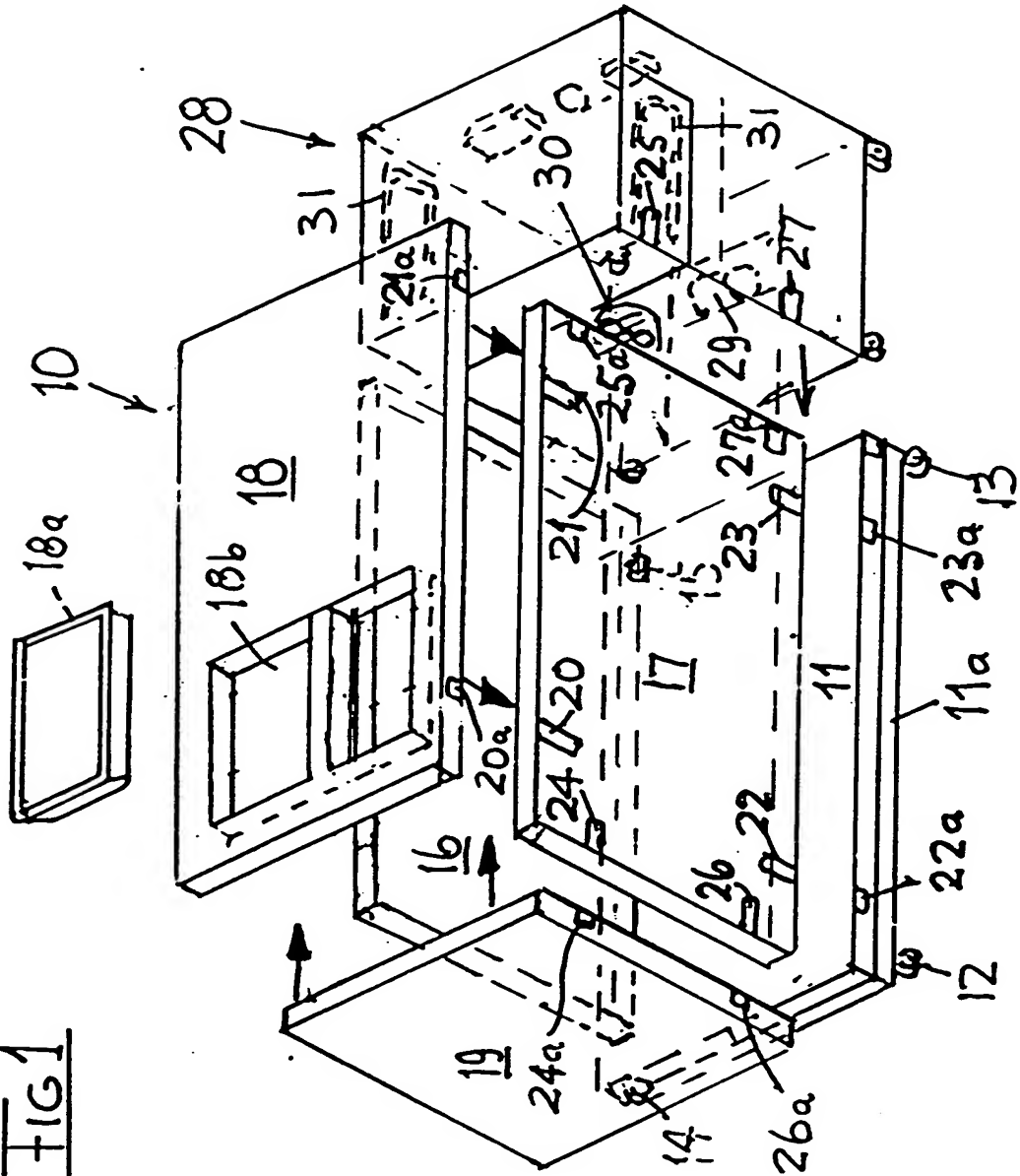
ABSTRACT

A modular system of stackable and interlatchable thermally insulated panels (16,17,18,19;116,117,118,119) can be assembled into a vertical storage cabinet (110) for hot or cold perishable foods or a horizontal wheelable trolley (10), both cabinet and wheelable trolley are latchably attachable to and detachable from a wheeled refrigeration unit (28,111) respectively; panels of the trolley are latchable together by means of co-operating pairs of latch members exemplified by (20,20; 21,21a; 22,22a; 23,23a; 24,24a; 26,26a; while the trolley is latched onto the wheeled refrigeration unit by latches (25,25a; 27,27a); the cabinet panels are locked together by latches 132,132a;133, 133a;134,134a; 135,135a; the bottom panel of the cabinet (111a) forms the top of the cabinet refrigeration trolley unit (111) and is latched to it by latches (136,136a; 137, 137a) shown on one side; the top panel of the trolley (111) is latched to it by latches on each side such as latches (138,138a;139,139a). the top panel of the cabinet refrigeration unit has an air circulation grill (111b) in it circulating air within the cabinet (110)

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

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FIG 1



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FIG 2

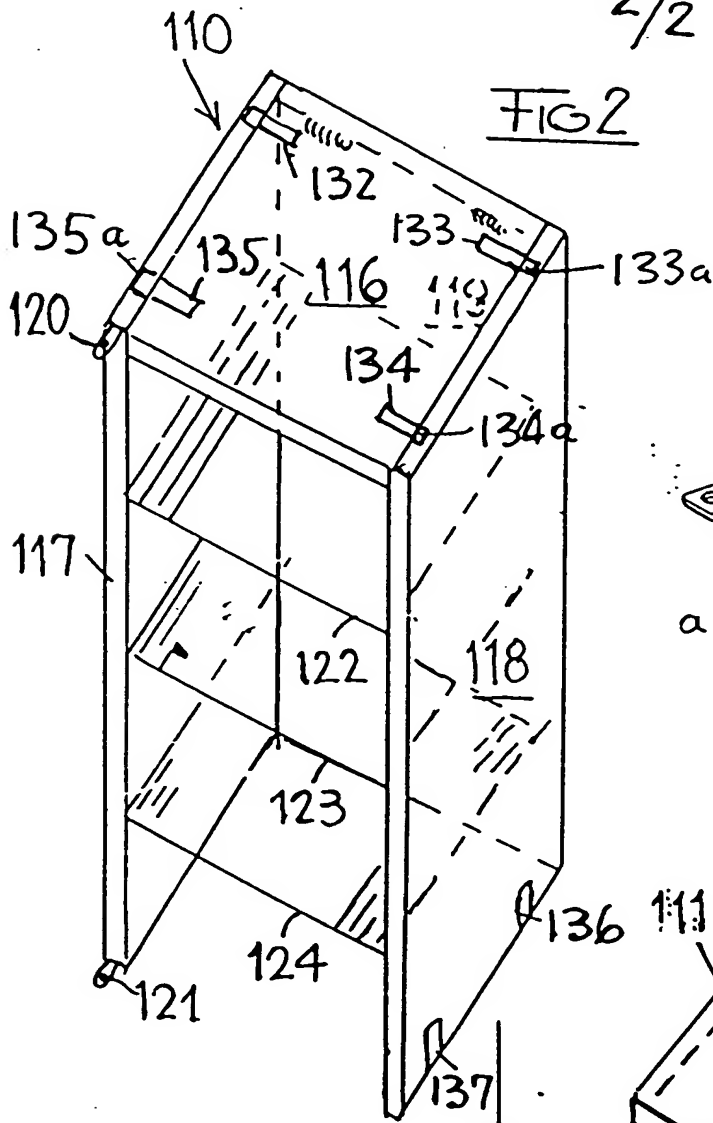


FIG 3

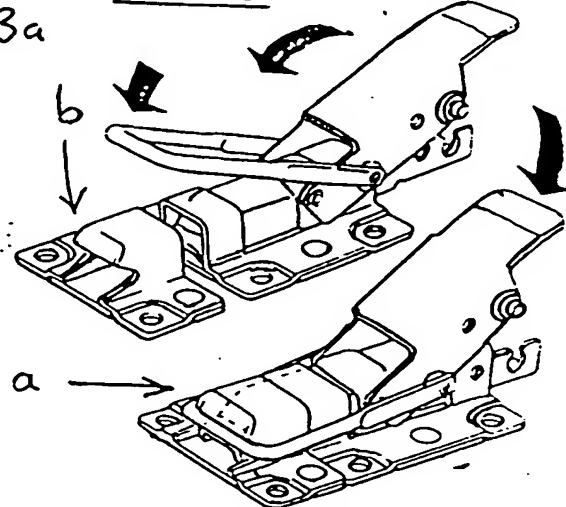


FIG 3A

